

REMARKS

This is intended as a full and complete response to the Office Action dated October 9, 2003, having a shortened statutory period for response set to expire on January 9, 2004. Please reconsider the claims pending in the application for reasons discussed below.

In the specification, the paragraph [0035] has been amended to correct an editorial problem. No new matter has been added by this amendment.

Claims 1-14 and 17 remain pending in the application and are shown above. Claims 1, 2, 7-10, 12, 13, 14, and 17 have been amended and claims 15, 16 and 18-20 have been cancelled by Applicants, without prejudice. No new matter has been added by these amendments. Claims 1-20 are rejected. Reconsideration of rejected claims is requested for reasons presented below.

Claims 1-13, 16, and 18-20 stand rejected under 35 USC 103(a) as being unpatentable over *Vilkomerson* (U.S. Patent No. 4,019,818). Claims 16 and 18-20 have been cancelled.

Regarding claims 1-11, *Vilkomerson* does not teach, suggest, or disclose an interferometer, comprising "an information processing system ... for comparing the first voltage and the second voltage to determine out-of-plane displacements between the mirror and the disc surface as a function of phase change in the output beams." *Vilkomerson* discloses a "signal translating means," shown at 118 in FIG. 3, for processing two signals. The signal translating means 118 first comprises a pair of hi-pass filters (302-1, 302-2) for filtering the DC and low frequency components of the signals. The signal translating means 118 further includes multipliers (306-1, 306-2) and an operational-amplifier summer (310). Intensity of the two signals (I_{S1} and I_{S2}) is multiplied. When the multiplied signals I_{S1}^2 and I_{S2}^2 are combined in the operational-amplifier summer (310), the phase data for the signals is lost. Without this data, out-of-plane displacement cannot be determined.

The information processing system of the interferometer of claims 1-11 and 17 utilize phase data for the purpose of determining out-of-plane displacement between the mirror surface and the disk surface. *Vilkomerson* does not teach a phase unwrapping

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system. *Vilkomerson* teaches away from the phase unwrapping, as its signal translating means actually removes the phase data.

Further, the presence of the high-pass filters in *Vilkomerson*'s signal translating means 118 would not work for determining out-of-plane displacement between a mirror and a disc surface. (See Application, para. 7, lines 21-23; *Vilkomerson*, col. 6, lines 27-37.)

Therefore, claim 1 is patentable over *Vilkomerson*. Claims 2-11 and 17 are also patentable over *Vilkomerson* since they depend from claim 1.

Regarding claims 12-13, *Vilkomerson* does not teach, suggest, or disclose a method, comprising "processing the first and second voltages to determine intensity of the first assembled beam and the second assembled beam as a function of phase angle, respectively; using an information processing system to unwrap the first and second phase angles; and comparing the unwrapped first and second phase angles to determine beam displacement caused by variations in the disc surface as a function of phase change in the output beams." As noted above, the phase data is lost using the method taught by *Vilkomerson*. Thus, claim 12 is patentable over *Vilkomerson*. Claims 13 is also patentable over *Vilkomerson* since it depends from claim 12.

Claims 14, 15 and 17 stand rejected under 35 USC 103(a) as being unpatentable over *Bou-Ghannam*, (U.S. Patent 5,710,631). Claim 15 has been cancelled and claim 17 now depends from claim 1. Regarding claim 14, *Bou-Ghannam* does not teach, suggest, or disclose a method having the steps of "using an information processing system to unwrap the first and second phase angles based upon sinusoidal equations", "determining a weighted average from the first phase angle and the second phase angle" or "adding positive and negative values of a constant in response to slope direction of the weighted average to provide a phase function." *Bou-Ghannam* discloses providing a phase function using four beams. In addition, *Bou-Ghannam* uses a tangential method for unwrapping the phase angles. *Bou-Ghannam*'s method does not provide a phase function from only two beams, and therefore does not calculate a weighted average for only two beams to improve accuracy. In addition, *Bou-Ghannam* does not disclose unwrapping based on sinusoidal equations. Therefore, claim 14 is patentable over *Bou-Ghannam*.

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The Examiner indicated that should claim 1 be found allowable, claim 16 would be objected to as being a substantial duplicate thereof. Claim 16 has been cancelled.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed. Having addressed all issues set out in the office action, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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